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The
Florida Entomologist
Official Organ of the Florida Entomological Society

VOL. VII FALL NUMBER No. 2
OCTOBER, 1923

CITRUS CONDITIONS IN THE RIO GRANDE VALLEY AND THE SATSUMA SECTIONS OF ALABAMA TOGETHER WITH ADDITIONAL NOTES ON SAN JOSE SCALE SITUATION IN NORTHWESTERN ARKANSAS

By
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Orlando, Florida.

INTRODUCTION

The visit to the Rio Grande Valley was made under the auspices and on the invitation of the Extension Division of the Texas A. & M. College. A year ago they conducted a citrus school and it met with such success that it was decided to hold another one this year and it was held from June 25th to 30th inclusive. The object of the school was to give the citrus growers information regarding the diseases and insects and methods for their control. During the week somewhere around a thousand people attended the lectures at the various places.

General Conditions. The soil of the Rio Grande Valley is very fertile and citrus trees make a marvelous growth. Nursery trees one year old are much larger than are trees of the same age in Florida. The average 4-year old grove was as large as a 7 or 8-year old grove grown uder the average Florida conditions. In fact some of the trees planted 20x20 feet, 4 years ago, have branches which now meet.

Owing to the uneven distribution of rainfall throughout the year it is necessary to irrigate the trees in order to insure proper growth. The water for this purpose is pumped from the Rio Grande. As yet the gravity system is not in operation but

*Paper read before the August meeting of the Florida Entomological Society.

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a strong movement is on foot to bring about such a system of irrigation and no doubt in a few years not only will the present groves be irrigated by the gravity system but also great acreages in addition. So far as I could learn the cost of irrigating a grove varies from $10.00 to $12.00 per acre per year. No doubt the cost is different in different districts. Since the valley is near Mexico an abundant supply of labor is always available and the prevailing wage is one dollar per day for common labor.

Extent of Industry. According to the best information obtainable, 1,700,000 citrus trees have been planted during the past few years. This would be about 25,000 acres figuring on the basis that the trees were planted 20x20 feet. As yet the production of fruit has not been great but prospects are good for ten or twelve thousand cars within the period of 4 years. In fact this is the estimate given by the president of the Valley Citrus Exchange.

Varieties and Root Stocks. The Parson Brown, Pineapple and Valencias seem to be the varieties of oranges usually planted, while Duncan and Marsh Seedless were the leading varieties of grapefruit, 80% of the plantings consisting of grapefruit and only 20% of oranges. With one exception all of the citrus growers with whom I talked in the Valley are of the opinion that neither trifoliata nor lemon stock have any value for the growing of citrus trees in the Valley. Practically all the plantings are now on sour orange stock.

Injury from Winds. The injury caused by the winds is very great. A large part of the foliage on young trees is blown away and most of these trees are very much lop-sided. The foliage on the outside rows on the south and east sides of most groves is usually very sparse, due to the injury from winds. The fruit also is very badly blemished by being blown around so violently as to cause mechanical injury. In fact I rather thought that 99% of the blemishes seen in the Valley were caused by winds.

Diseases. Although an extensive search was made for melanose not a single spot was found in the entire Valley. Citrus scab was very serious on some sour seedlings in a nursery but the grapefruit trees did not seem to be seriously effected with this fungus disease. In one grove I saw what I presumed to be foot-rot and one case of a disease simliar to frenching was observed.

Insects and Mites. Since citrus trees have been shipped into the Valley from both Florida and California is is only natural

to expect that the same insect pests which are present in both of these localities should also be present in the Valley. Such is largely the case and we find about the same scale insects and mites present as in both Florida and California. The Florida red scale is supposed to be the most injurious scale present. It seems to thrive in the hot dry climate. Next in importance is the California red (this may be dictyospermum). This scale was observed in a grove, the trees of which were purchased in California, in great abundance. In fact this scale had nearly killed this entire grove which was only saved from total destruction by the use of oil emulsion two or three times last winter. The chaff scale, *P. pergandii,* does great damage to the twigs and trunk and no doubt is the third most injurious scale insect. The long scale, *L. gloverii,* is the fourth in importance and does much more damage than the purple scale. The purple scale is also present but I presume the sun is too hot for its proper development in great numbers. I understand the citrus white fly is present at Brownsville but I did not see it myself.

The citrus rust mite is present in the greatest abundance in the Valley. It often becomes so abundant that the limbs turn blue and the leaves take on a brown color and, in many cases, do not reach normal size. The fruit on several groves was badly russeted and in many cases the living mites and eggs were present on the fruit in countless numbers.

Even though rust mites are extremely abundant they can be very easily controlled by means of dusting with sulphur. Owing to the infrequency of rains the sulphur would remain on the foliage for long periods of time and sufficient to kill rust mites would no doubt be present until a rain came and washed it from the trees.

Entomogenous fungi. None of the entomogenous fungi attacking scale insects were observed. Neither the county agents nor Mr. E. W. Halstead had ever seen them in the Valley excepting on nursery stock when received. No doubt these fungi have been introduced many thousands of times and owing to the adverse climatic conditions have never established themselves. I did not find out if our Florida fungus on rust mites was present. Neither the citrus red spider nor the six-spotted mite, T. sexmaculatus, were observed. Another red spider, however, of a greenish tinge with dark spots on its back was observed at McAllen. I am of the opinion that this is the same red spider

as the one taken by me on some temple oranges at Homestead, Florida, in W. J. Krome's grove.

A local man was making the Government formula oil emulsion for controlling scale insects. The grade of oil being used was too light for best results and specifications of a better oil were given to him. They have already established a citrus experiment station in the Valley for the purpose of taking up the problems relating to the industry. No doubt this will solve many of the problems and difficulties which now seem almost insurmountable to the citrus growers.

Even though trees make a much more vigorous growth and labor is less than half what it is in Florida and no fertilizer has been required up to this time, the hazard from cold may outweigh the advantages above enumerated. Due to this cold hazard most of the growers will arrange for firing in case of necessity.

SATSUMA CONDITIONS IN ALABAMA

The satsuma industry in Alabama is in a flourishing condition with prospects this coming year for an increased yield over that of the past season. The Gulf Coast Citrus Exchange has employed Dr. H. L. Dozier to handle its insect and spray problems. Dr. Dozier has approached the situation with enthusiasm and vigor and no doubt his work will be exceedingly profitable to the members of the Exchange. One of his main objects is to teach the citrus growers the recognition and biology of the citrus pests. This is being done by lectures, personal interviews and writing for the Gulf Coast Citrus Grower. It is also his intention to carry on as much research work relating to sprays and insect biologies as time will permit.

SAN JOSE SCALE CONDITIONS IN NORTHWESTERN ARKANSAS

In Northwestern Arkansas I visited Messrs. Ackerman and Pierce, who showed me large acreages of apples which had been completely killed by the San Jose Scale and thousands of other trees which had been most severely damaged. The entire apple industry would have been wiped out in the Ozark district if these scientists had not introduced the oil emulsions. The apple-growers and business men are highly pleased with the results of these emulsions in the control of this scale. They use a heavy oil for making the emulsion and it retails for $12.00 a barrel which is less than half what Florida growers pay for emulsions made out of lighter oils.

THE GENERIC AND SPECIFIC NAME OF THE ORANGE RUST MITE

Some confusion has arisen in regard to the proper generic name for the orange rust mite and also the proper spelling of its specific name.

The generic name *Typhlodromus* under which the mite was originally described does not appear in recent literature on the gall mites and is not mentioned in either Nalepa's 1898 monograph of this group or in his extensive 1911 monograph. This genus was established by Scheuten in 1857 for the pear leaf blister mite, now known as *Eriophyes piri* (Pgst.). In Scheuten's paper the name of his proposed genus is neither set off by a center heading or a paragraph heading, hence has undoubtedly been overlooked by most entomologists. Being monobasic and having *Eriophyes piri* (Pgst.) as a type, the genus is evidently only a synonym of *Phytoptus* Dujardin (1851), which in turn is a synonym of *Eriophyes* Siebold (1851).

Notwithstanding the fact that the orange rust mite clearly belongs to the genus *Phyllocoptes*, which genus was established by Nalepa in 1889, it is sometimes mentioned as being an *Eriophyes*, if perchance neither of the two untenable names, *Typhlodromus* or *Phytoptus*, are used. The reason for this is not hard to find. The drawing of this species given by Hubbard many years ago, which drawing frequentily has been copied in more recent years and which is the only drawing of this mite with which most entomologists are familiar, actually represents the species as being an *Eriophyes!*, *i. e.*, all of the abdominal rings are shown as being complete rings, whereas in reality half of them are only half rings.

The proper genus for this mite is clearly *Phyllocoptes* Nalepa.

The spelling of the specific name of this mite also varies. In accumulated notes and papers it has been spelled *oliioorus*, *oleivorus*, *oilivorus* and *oil-livorus*. The first mentioned is the spelling under which the species was described. Evidently it was badly garbled either in manuscript or in the printing of the same. In Ashmead's notes accompanying the original description of the mite mention is made of its feeding on the oil of the orange, hence the supposition has been that he intended to indicate this fact in the name proposed. All of the renderings of the name, other than the original spelling, seem to indicate this

intention, but unfortunately not everyone would form the name in the same way.

If a subsequent paper published by Ashmead in his "Orange Insects", only a year after the publication of this original description of the mite, had not been so commonly overlooked, this confusion would have been largely avoided. In his "Orange Insects," published in 1880, there occurs on page 40 the following sentence: "I immediately began to study it (the rust mite), and soon after wrote him (Rev. T. W. Moore) that I had discovered what it was and forwarded a description of it for publication, crediting him with the discovery, under the name of *Typhlodromus oleivorus, i. e.*, oil eating from supposing it to feed on the essential oil of the orange."

Thus the earliest amended spelling of the specific name, and in this instance the more properly formed, is *oleivorus*. The proper scientific name for the orange rust mite, therefore, is *Phyllocoptes oleivorus* (Ashmead).

H. E. EWING
U. S. Bureau of Entomology.

A GEOMETRID LARVA ON GRAPEFRUIT

The writer has recently received a number of larvae of the Geometrid moth *Microgonia vesulia* Cramer which were collected on grapefruit trees. The larva is not apt to be confounded with anything else, being a large gray looper, fully four inches long when mature. The majority of the larvae were parasitized by a Tachinid fly, and only the very young larvae lived to produce moths. These parasites will probably prevent the insect from ever becoming of any importance as a pest.

I am indebted to Mr. F. H. Benjamin for the determination. The moth is figured by Holland (Moth Book, pl. XLV, f. 11) under the name *Oxydia vesulia*. Grossbeck (Insects of Fla., IV, p. 102) gives the food plant of the larvae as oak. According to these authorities it is found over south Florida, and extends to Texas and through Mexico and the Antilles to Brazil. A series of the bred specimens is preserved in the author's collection.

D. MARSTON BATES.

PERSONALS

New members of our society are T. H. Hubbell and John Gray. Prof. Hubbell comes to assist Dr. Rogers in the teaching of entomology in the University. He is an ecologist and particularly interested in orthoptera. Mr. Gray is Professor of Economic Entomology and Pathology in the Agricultural College.

Mr. D. Marston Bates of Ft. Lauderdale, the youngest member of our society and an earnest student of microlepidoptera, has entered the University. He is also working as part time assistant in the Department of Entomology of the Experiment Station.

Mr. R. L. Trigg has resigned his position as research fellow for the National Research Council located at the Experiment Station to accept a position with the Federal Horticultural Board. He will be located at New York. Mr. Trigg has secured some valuable data on the influence of sulphur on the root-knot nematodes.

Reginald Hart has been acting as assistant to the entomologist of the State Plant Board during the absence of Mr. Geo. Merrill on a short vecation in the Carolinas.

Among the publications recently published by our members are two by Dr. H. S. Davis of the U. S. Bureau of Fisheries on diseases of fish and three by Dr. Carl J. Drake in Technical Publication No. 16, of the N. Y. State College of Forestry.

Mr. A. H. Beyer recently visited Lakeland Highlands where "pumpkin bugs", *Nezara viridula*, were doing much damage to citrus. They were killing limbs of grapefruit trees an inch or two in diameter. They attack the upper side of limbs bending under the weight of fruit at the point of maximum bending, where it seems to be easier for them to pierce the bark. This type of injury was first brought to our attention last year. The infestation was due to a crop of cowpeas that was allowed to grow until about the first of October instead of being cut by the middle of September as has been recommended.

A recent correspondent writes concerning the "fungas" in his grove. A member of the Board of Control once said that Dr. Berger is the man who put the fun in fungus. Who inserted the gas?

The
FLORIDA ENTOMOLOGIST
Official Organ of The Florida Entomological Society, Gainesville, Florida.

J. R. WATSON.....*Editor*
WILMON NEWELL.....*Associate Editor*
A. H. BEYER.....*Business Manager*

Issued once every three months. Free to all members of the Society.

Subscription price to non-members is $1.00 per year in advance; 35 cents per copy.

THE SCALE INSECTS OF FLORIDA

The last number of the Quarterly Bulletin of the State Plant Board of Florida (Vol. VII, No. 4) consists chiefly of an illustrated catalog of the scale insects of Florida by Geo. B. Merrill and Jeff Chaffin. This is a very valuable reference work which should be in the hands of everyone interested in the insects of Florida.

NATURAL CONTROL OF ANTS

A fruit grower in attendance at the Farmers' and Fruit Growers' Short Course reported a novel method of controlling ants nesting about the bases of young citrus trees where the use of solutions of sodium cyanide or carbon disulphide would be unsafe. He collects a number of ant-lion larvae ("doodle-bugs") and liberates them about the bases of the infested trees. The larvae at once "dig in" and construct their deadly funnels. The result is a prompt and satisfactory clean up of the ants.

A PROMISING NEW BAIT

It has been found that a flavoring of nitrobenzine added to the poisoned bran bait (25 pounds of bran thoroly mixed with a pound of paris green) is very attractive to a variety and large range of insects. It was first tried by U. S. D. A. workers as a bait for web-worms (*Crambidae*). The Experiment Station found it quite attractive to the celery leaf-tyer at Sanford. The Official Record of the U. S. D. A. for July 18, 1923, reports its successful use against tobacco wireworms at Clarksville, Tenn. If it is attractive to such diverse insects as wireworms and caterpillars it is quite possible that it will be found of value against a large number of insects. It is at least worthy of a trial against almost any biting insect.

THE BUMBLE BEES OF FLORIDA[1]

P. W. FATTIG

Altho there are 58 species of Bombidae in the U. S.,—47 of the genus Bombus—the true bumble bees, and 11 of Psithyrus—the parasitic bees; only five species, four Bombus and one Psithyrus, occur in Florida. Thus it is seen that these bees are but poorly represented in Florida. They are most abundant in the Rocky Mountains. The following key will enable the reader to separate our species.

A. Outer surface of hind tibiae convex and hairy; face of males black **Psithyrus.**
Abdomen of female entirely dark; that of male very variable..... **P. variabilis.**

AA. Outer surface of hind tibiae of female concave and smooth; face of male usually with yellow..... **Bombus.**

a. Thorax with a distinct black band.
b. First and second segment of abdomen yellow....**B. fraternus.**
bb. First, second and third segments of the abdomen yellow..... **B. pennsylvanicus.**

aa. Thorax without a distinct black band.
b. Dorsum of the abdomen with the first segment yellow and the remaining segments black..... **B. impatiens.**
bb. Dorsum of the abdomen with the first segment yellow, the second segment more or less brown-ferruginous on the basal portion, especially in the middle—the remaining segments black ..... **B. separatus.**

B. fraternus nests in the ground or in holes in stumps or trees at the level of the ground. It is one of the most pacific of the bumble bees. Its coloration is very constant.

B. impatiens also nests in the ground.

B. pennsylvanicus nests on top of the ground, usually in old mouse nests and similar situations. Occasionally the nests are subterranean.

B. separatus nests in the grass on the surface of the ground. It is one of the most pugnacious of bumble bees when its nest is attacked.

Bees of the genus Psithyrus are parasitic on the true bumble bees which they mimic in color and actions. Usually they mimic most closely the species of Bombus on which they are parasitic. The Psithyrus queen enters the Bombus nest and kills the queen. The young Bombus bees then adopt the Psithyrus queen, feed her and tend and raise her brood.

[1]Abstract of a paper read before the Fla. Entomological Society March, 1920.

FOOD HABITS OF THE PECAN TWIG GIRDLER

In the latter part of October Mr. Robert R. Thompson of the Palmer Corporation at Sarasota sent to the Experiment Station specimens of an insect that was severely pruning his roses. It was the hickory twig girdler, *Oncideres cingulata.* This is the first instance of its attacking roses in Florida that has come to our attention altho Felt, in "Insects Affecting Park and Woodland Trees", records it as an occasional pest of roses. In Florida in addition to hickories, including the pecan, which are its normal hosts, it frequently attacks Japanese persimmons and Australian pines, *Casuarina equsetifolia,* and occasionally the water beech, *Carpinus Carolinana,* and citrus trees. In the northern states it commonly attacks elms. Felt also lists oaks, apple, plum, linden, pear, and peach. A peculiarity of their attacks upon Australian pines is that they seldom lay any eggs in the girdled twigs. Evidently the stimulus of the tree (which is not really a pine) excites, thru smell, sight, feel, or other sense, the girdling instinct but not the egg-laying instinct.

"BRAZILIAN ANT EATERS"

P. H. ROLFS

Friends and Associates or the Florida Entomological Society:

I send you words of greeting from the land of the lure, where the skies are higher, where the stars are more numerous in the sky, and where the Southern Cross shines every night to remind one of his duty to his fellow man. Brazil, the land where great rivers flow without having names, where mountain ranges occur that are not even indicated on the maps. This vast interior is really the Brazil. Rio de Janeiro, Sau Paulo, and the other large coastal cities are merely cosmopolitan conglomerations like New York, Chicago and New Orleans. One has to get away from these cities to really know and appreciate the Brazil for what she is. Three million people could live in this territory and find themselves less cramped than a hundred million in the United States.

Well, what I started out to write you about was the ant eaters of Brazil. At first you will say that this is not an entomological problem. Maybe the eating of honey is not an entomological problem, but even entomologists condescend at times to satisfy their gastronomic longings for that delicacy.

THA SAUVA (Atta sexdens, L.)

The destructiveness of this species is attested in all agricultural countries in tropical America, ranging from Texas to Argentina. It is the "billion dollar insect", destroying far more than the boll weevil, with which the Florida entomologists are quite familiar.

The formicaries of this "bicho" are often from six to eight meters across and the range of the activity of the ants from one nest may be as great as a hundred meters. Frequently they connect their formicaries with the field in which they are cutting by long tunnels. I have a photograph of one formicary that went to a depth of more than four meters.

Naturally formicaries of this size can breed a great quantity of sauvas, and each year produce thousands of tanajuras (queens). During the spring (October and November), after the rains have commenced, these tanajuras make their nuptial flight. Fortunately the distance they fly from the formicary is not great. The largest number of them alight within one hundred meters of their birthplace. After divesting themselves of their wings these new queens begin to excavate and then commence a new colony. Each one carries with her enough "ambrosia" to care for herself and progeny until the first set of workers are ready to bring in the organic matter on which to plant the mushrooms.

EATING TANAJURAS.

These tanajuras are of a considerable size. With their wings folded back they measure from four to six centimeters. Their wing-spread is six to seven centimeters. Just after they have shed their wings the tanajuras are considered a particularly appetizing morsel. We had been told repeatedly that the aborigines ate them, and that some of the country people cooked them. So we made particular inquiry to find out how this particular feat was accomplished. It seems that the regulation way is to pull off the heads and fry the abdomen and thorax in hot fat. So Mrs. Hargrave (nee Effie Rolfs) prepared some of them for us. While in the hot fat, the abdomens burst, sounding and appearing very much like popcorn. In eating quality, too, they are about like good popcorn, crush readily and give off a rather pleasing, evanescent aroma.

Mrs. Long, a teacher in the Methodist Missionary School at Juiz de Fora, tells us that she has frequently seen the moleques (negro urchins) in the school there pull off the heads and wings and eat the remainder with a great deal of gusto.

There is no reason why one should have a great aversion to eating tanajuras. They are absolutely cleanly about their formicary. For thousands, possibly millions of generations they have lived upon nothing but mushrooms. They are much more cleanly and certainly more appetizing in appearance than either oysters or shrimp, though of course their color is somewhat dark, almost black.

If any of you are "from Missouri". on this proposition, just make us a visit next spring (October or November) and we will give you an opportunity of changing your mind.

REPORTS OF MEETINGS

August 9, 1923.—A special meeting of the Society was held during Farmers' and Fruit Growers' Week at the University. A large number of visitors and members were present. President G. F. Merrill presided. The paper of the evening was by Mr. Yothers on "Citrus Conditions in the Rio Grande Valley of Texas and in the Satsuma District of Alabama". This paper is printed in full in this issue of the Entomologist.

September 21—A meeting of the Society was held during County Agents' Week.

Meeting was called to order by the temporary chairman, J. R. Watson. Members present, Beyer, Briggs, Burger, DeBusk, Gomme, Kime, Link, O'Byrne, Warren and Watson. A large number of visitors were also present.

The subject of the meeting was "Most Important Insect Problems and Their Control." This was discussed by a number of the county agents.

The first speaker, E. F. DeBusk, Extension Citrus Pathologist, formerly county agent of Lake County, spoke of the aphid injury to the watermelon crop and control measures. He brought out very strongly the idea of agitation for a bill to the legislature to standardize spray materials.

Wm. Gomme of Polk County also spoke of watermelon insects and stated that in his opinion spraying was more efficient than dusting. He spoke of Florida Red Scale as being particularly bad. Spray burn from oil emulsion was noticed from June to October. He also commented on the serious infestation of mealy bugs the past season, but declared that it was brought under good control by means of the parasite Paraleptomastix, distributed by the Experiment Station.

C. D. Kime of Orange County mentioned about the same troubles as the former speakers, but added rust mite injury.

W. R. Briggs of Manatee County told of controlling aphids on peppers by means of nicotine sulphate. He had success in controlling the Garden Flea Hopper with kerosene emulsion.

Alfred Warren of St. Lucie County spoke of the Florida Red Scale as a puzzling insect.

J. S. Rainey of Dade County brought out the idea that control work is more or less regulated by the market price of fruit; as a result the groves have been neglected. He considers avocados of primary importance and thinks citrus will become secondary. He expressed the opinion that spraying or dusting of fruit should be made compulsory by law.

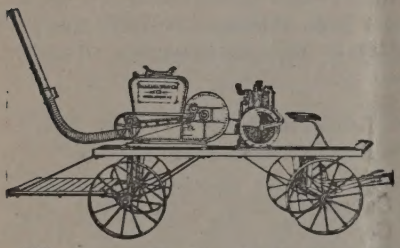
General discussion followed and the meeting adjourned at 6:00 p. m.

October 31.—The Society met in Language Hall at 4:30 with President Merrill in the chair. Members present were, Ayers, Bates, Beyer, Berger, Chaffin, Floyd, Goodwin, Hart, Merrill, O'Byrne, Walker, and Watson. Following a rather extended business meeting Mr. Reginald Hart spoke of his work on an insect survey of the lower East Coast. Among the insects collected and sent to Mr. George Merrill for identification were eight species of scale insects new to Florida, including two species new to science. He spoke of the importance of the insect pests of ornamentals to that portion of the state. In that connection Prof. Watson mentioned the recent finding of a heavy infestation of root-knot on the roots of Washingtonia palms. The roots do not produce the characteristic knot-like galls. Prof. T. H. Hubbell and Prof. John Gray were elected members of the Society.

A. H. BEYER, Sec'y.

TRY NICOTINE SULPHATE

A correspondent writes that his cucumbers are troubled with "yeapus."



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